

Structural dynamic study of roof waterproofing materials

Kemalov A., Kemalov R., Valiev D., Abdrafikova I.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2014 by the author(s). The present research was aimed to develop the scientific applied principles and technologies of composite bituminous materials for civil engineering based on the investigation of the structures of polymer modifier and bitumen-polymer binder (BPB) on its basis with the use of nuclear magnetic resonance (NMR). The method of pulsed NMR was chosen as one of the rapid analysis methods that can be used for the analysis of bitumen-polymer systems, especially when assessing the group chemical composition of residual oil feedstock (ROF), bitumens and composite materials based on them. Using the method of pulsed NMR the regularities of the impact of modifier component composition on the changes of structural-group composition of the original and modified products were specified. Based on the results of research the optimal ratio of bitumen-polymer binder components was investigated, the manufacturability of the process for obtaining of composite bituminous materials for civil engineering with the aim of optimizing the quality of the final products was evaluated. Pulsed NMR - spectroscopy is suggested as input and output quality control of bituminous products. The regularities of redistribution of the phases with different molecular mobility and their relationship with the binder components were investigated. Rapid technique for quantifying the content of polymer in the solvent was developed.

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Keywords

Bitumen-polymer binder, Pulsed NMR, Roof waterproofing materials, Structural-group composition, Thermoplastic resins